IN THE CLAIMS:

Please cancel claims 2-5 and 8-10 without prejudice.

Please amend the claims as follows:

1. (4x Amended) A method for improving optical interactance measurements comprising the steps of:

passing illumination along a plurality of different transmission paths through an interior portion of a material having a characteristic to be measured;

defining each of said paths by [two distinct] corresponding and separated surface areas [of] on said material, one of said surface areas for passing illumination into said material and the second of said surface areas for passing transmitted illumination from said material for detection, at least one of said surface areas of [one] each of said paths being extended in length at substantially constant spacing from the other surface area of said [one path;] each of said paths, the total length of said extended surface area of said each of said paths being substantially greater than the mean distance separating said corresponding and separated surface areas defining said each of said paths;

sensing a plurality of independent signals developed at the same time or in rapid sequence representing optical informa-

tion obtained from within said material in response to said illumination passing along said different paths, each independent signal corresponding to a particular path; and

processing said signals in accordance with appropriate modeling techniques to determine qualitative or quantitative characteristics of the material.

Claim 2, line 1 change "claim 1" to --claim 33--.

Claim 6 (3x Amended). [The method of claim 1] A method for improving optical interactance measurements comprising the steps of:

passing illumination along a plurality of different transmission paths through an interior portion of a material having a characteristic to be measured;

defining each of said paths by corresponding and separated surface areas on said material, one of said surface areas for passing illumination into said material and the second of said surface areas for passing transmitted illumination from said material for detection, at least one of said surface areas of each of said paths being extended in length at substantially constant spacing from the other surface area of said each of said paths, the total length of said extended surface area of said each of said paths being substantially greater than the distance separating said corresponding and separated surface areas

defining said each of said paths;

[including the step of] directing the illumination at the surface of said material at an angle with respect to the illuminated surface of said material and generally towards the respective detection surface area on said material;

sensing a plurality of independent signals developed at the same time or in rapid sequence representing optical information obtained from within said material in response to said illumination passing along said different paths, each independent signal corresponding to a particular path; and

processing said signals in accordance with appropriate modeling techniques to determine qualitative or quantitative characteristics of the material.

7. (4x Amended) Apparatus for optical interactance measurements of an interior portion of a material, said measurements being effected by passing illumination through portions of the material comprising:

aperture means for defining corresponding [distinct] and separated [illumination and detection] surface areas on said material for defining each of a plurality of transmission paths [within] through an interior portion of said material, one of said surface areas for passing illumination into said material and the second of said surface areas for passing transmitted illumination from said material for detection, at least one of

said surface [area of at least one] areas of each of said transmission paths [extending in a direction substantially transverse to the direction of illumination passage along said one transmission path] being extended in length and substantially constantly spaced from its corresponding surface area, the total length of said extended surface area of said each of said transmission paths being substantially greater than the mean distance separating said corresponding and separated surface areas defining said each of said transmission paths;

means for directing illumination onto said illumination surface areas and along said transmission paths;

means for sensing optical information indicative of said interior portion of said material [and] developed by illumination passing along said transmission paths [at] to said detection surface areas of said transmission paths;

means, responsive to said sensing means, for developing a plurality of independent signals corresponding in number to said plurality of paths, said signals representing said optical information obtained from within said material; and

means for processing said signals in accordance with appropriate modeling techniques to determine qualitative or quantitative characteristics of the material.

Claim 8, line 1, change "claim 7" to --claim 36--.

Claim 9, line 1, change "claim 7" to --claim 36--.

Claim 10, line 1, change "claim 7" to --claim 36--.

26. (3x Amended) Apparatus for improving optical interactance and transmittance measurements comprising:

an elongated probe having a body portion and a tip portion, the body portion comprising a central tubular element surrounded by an annular outer element;

the tip portion having a central aperture which communicates with said central tubular element and a plurality of rings which communicate with said annular outer element;

[the ring in said tip portion being angled with respect to the longitudinal axis of the probe;]

a plurality of [the] fiber optic bundles whose number corresponds to said plurality of rings being disposed within said outer element, each bundle being arranged annularly within a respective ring at [one] said tip end [to exit at a respective ring] for receiving optical information [relating to] from within a particular material and, at the other end, each bundle being adapted to be connected to a detector for developing [s] an independent signal corresponding to an illumination path through said material, and

said central tubular element [being] containing optical elements connected [at one end] with a source of illumination, which illumination will exit at the central aperture[;]

[whereby independent signals responsive to said illumination representing said material information may be developed and whereby surface phenomena of said material may be excluded during measurement].

33. (Amended) [The method of claim 1] A method for improving optical interactance measurements comprising the steps of:

passing illumination along a plurality of different paths through an interior portion of a material having a characteristic to be measured;

[including the step of] defining each of said paths by [at least one extended surface area] corresponding and separated surface areas on said material, one of said surface areas for passing illumination into said material and the second of said surface areas for passing transmitted illumination from said material for detection, at least one of said surface areas of each of said paths being extended in length at substantially constant spacing from the other surface area of said each of said paths, the total length of said extended surface area of said each of said paths being substantially greater than the mean distance separating said corresponding and separated surface

areas defining said each of said paths, an extended surface area of at least one of said paths being [distinct and] contained within the boundary defined by an extended surface area of another of said paths and being substantially surrounded by the extended surface area of said another of said paths;

sensing a plurality of independent signals developed at the same time or in rapid sequence representing optical information obtained from within said material in response to said illumination passing along said different paths, each independent signal corresponding to a particular path; and

processing said signals in accordance with appropriate modeling techniques to determine qualitative or quantitative characteristics of the material.

Claim 34, line 1, change "claim 1" to --claim 33--.

35. (Amended) [The method of claim 1] A method for improving optical interactance measurements comprising the steps of:

passing illumination along a plurality of different paths through an interior portion of a material having a characteristic to be measured;

defining each of said paths by corresponding and separated surface areas on said material, at least one of said surface areas of one of said paths being extended in length at

substantially constant spacing from the other surface area of said one path;

sensing a plurality of independent signals developed at the same time or in rapid sequence representing optical information obtained from within said material in response to said illumination passing along said different paths, each independent signal corresponding to a particular path; and

processing said signals in accordance with appropriate modeling techniques to determine qualitative or quantitative characteristics of the material;

wherein said steps of passing illumination and sensing [steps] are provided by an instrument for said interactance measurement and said method further includes the steps of moving said instrument a predetermined distance away from said material and performing a reflectance measurement of said material.

36. (Amended) [The apparatus of claim 7 wherein said] Apparatus for optical interactance measurements of an interior portion of a material, said measurements being effected by passing illumination along a plurality of different transmission paths through an interior portion of a material having a characteristic to be measured, comprising:

aperture means [are] operative to define each of said paths by [at least one extended surface area] corresponding and separated surface areas on said material, one of said surface

areas for passing illumination into said material and the second of said surface areas for passing transmitted illumination from said material for detection, at least one of said surface areas of each of said paths being extended in length at substantially constant spacing from the other surface of said each of said paths, the total length of said extended surface area of said each of said paths being substantially greater than the distance separating said corresponding and separated surface areas defining said each of said paths, an extended surface area of at least one of said paths being [distinct and] contained within the boundary defined by an extended surface area of another of said paths and being substantially surrounded by the extended surface area of said another of said paths;

means for directing illumination onto said illumination surface areas and along said transmission paths;

means for sensing optical information indicative of said material developed by illumination passing along said paths to said detection surface areas of said paths;

means, responsive to said sensing means, for developing a plurality of independent signals corresponding in number to said plurality of paths, said signals representing said optical information obtained from within said material; and

means for processing said signals in accordance with appropriate modeling techniques to determine qualitative or quantitative characteristics of the material.

Claim 37, line 1, insert after "claim 7" --or claim 36--.

Claim 38, line 1, insert after "claim 7" --or claim 36--.

Claim 39, line 1, insert after "claim 7" --or claim 36--.

Claim 42, line 1, insert after "claim 7" --or claim 36--.

43. (Amended) Apparatus for effecting optical interactance and reflectance measurements relative to a material, having a characteristic to be measured, comprising:

optical means, [when said apparatus is disposed] at a first predetermined distance from a surface of said material, for defining on said material at least one illumination surface area and at least one detection surface area which are [distinct] separated, said surface areas on said material defining at least one transmission path through an interior portion of said material for performing interactance measurements, at least one of said surface areas of one of said paths being extended in length at substantially constant spacing from the other surface area of said one path, and, [when disposed] at a second predetermined distance, relative to the surface of said material, for defining illumination and detection surface areas on said

material which are at least partially superimposed thereby defining a surface area on said material for performing diffuse reflectance measurements;

said optical means including means for illuminating said illumination area, [and] for detecting optical information received from said detection area, and for sensing signals representing said optical information obtained from said material in response to said illumination; and

means for processing signals detected by said optical means in accordance with appropriate modeling techniques to determine quantitative or qualitative characteristics of the material.

Claim 44, line 2, delete "when disposed".

Claim 45, line 2, delete "when disposed".

Claim 46, line 2, delete "when disposed".

Claim 47, line 2, delete "when disposed".

Claim 48, line 2, delete "when disposed".

Claim 49, line 2, delete "when disposed".